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Activities for September
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October, 1932

ANNUAL ROLL CALL - AMERICAN RED CROSS

The annual membership roll call of the American Red Cross will take place during the period from November 11 to 26. The facilities of this splendid organization are being utilized to relieve distress throughout the country on a scale never previously attempted.

To continue this work and to provide for the regular activities of disaster relief, assistance to service men and veterans, public health nursing, etc., requires the support of all our people. The employees of the Department of Agriculture have always responded generously to such appeals and I urge them to give increased support to this most urgent plea.

Arthur M. Hyde,
Secretary.

TOXICOLOGY AND PHYSIOLOGY OF INSECTS

Organic compounds of sulphur show insecticidal value.---F. L. Campbell and W. N. Sullivan, Takoma Park, Md., in a summary of results of their tests against mosquito larvae of organic compounds containing sulphur, state that "Of 17 organic compounds containing sulphur that were tested against mosquito larvae, 4 were found to be more toxic than nicotine: i. e., 2-phenyltetramethylene-1,3-disulfide, phenylacetimido thiophenyl ether hydrochloride, benzimido thiophenyl ether hydrochloride, and diphenyl sulphone."

BEE CULTURE

Apparently more profitable to feed bees honey than sugar sirup.---Some interesting facts on apiary management are reported by G. E. Marvin, Somerset, Md.: "One large beekeeper spends many hours in the fall and the spring feeding sugar sirup to bring the colonies up to strength for the honey flow, after having taken away too much honey to be extracted. Another operator in the same State puts down into the brood nest 6 or 7 frames of honey from the last super and, although he lowers his yield, he avoids sirup feeding and thereby lowers the cost of production considerably over that of the beekeeper who does the feeding. It appears more profitable to follow the latter procedure of saving out frames of honey for bees than to feed sugar sirup, even though the honey saved is from the main honey flow."

FRUIT AND SHADE TREE INSECTS

Two-inch bands as effective for codling moth as wider ones.--E. H. Siegler, of the Takoma Park, Md., laboratory, in reporting the results of cooperative experiments at Grand Junction, Colo., with chemically treated bands of different widths for capturing codling moths, states: "There is practically no difference between bands of different widths when applied to the same trees in a truly comparative test. *** The 2-inch band is the most practical one, even under conditions in Colorado where the codling moth population is high. *** The results are based on a considerable number of individual larvae."

Cultural control experiments with the grape berry moth.--G. A. Runner, of the Sandusky, Ohio, laboratory, reports on tests of cultivation to prevent the emergence of grape berry moths (Polychrosis vitiana Clem.). Field cages were placed over cocoons that had been kept over winter, the soil covering--from 1/2 inch to 4 inches--being the same as that given by the disk or plow used for cultivation before emergence was at its height. Check lots of unburied cocoons were kept in a compartment in each cage. Of the unburied cocoons 64.5 per cent yielded adults of the grape berry moth, whereas only 1.4 per cent of the insects emerged from the cocoons that had been buried. Similar cage tests of cocoons of the summer brood showed only a slight emergence from soil coverings of 1/2 inch to 3 inches.

California red scale develops more rapidly in the shade than in the sun.--Lillian Baird, of the Whittier, Calif., laboratory, makes the following report on studies of Chrysomphalus aurantii Mask.: "The average length of the developmental period of the (California red) scales set out on June 22 was 79.9 days in the sun and 66.6 days in the shade. The developmental period of scales set out on June 29 averaged 76.1 days in the sun and 69 days in the shade. Evidently exposure to direct sunshine retarded the development of the scales somewhat."

California red scales produced during different portions of the life of the female scale vary in resistance to cyanide fumigation.--H. R. Yust reports on an experiment at the Whittier laboratory to determine any possible difference in resistance to cyanide that may be exhibited by California red scales produced early or late in the productive period of the mother scales. The work was conducted in the constant-temperature room. The results of the experiment indicate that scales produced during the first 30 days of the productive period exhibited almost twice as great resistance to cyanide gas as scales produced during the next 40 days. The scales were in all stages of development at the time of fumigation.

The oriental fruit moth has many species of parasites in Japan.--G. J. Haeussler reports the finding of 38 species of parasites of the oriental fruit moth in the course of the survey which he is making in Japan. He states that 8 additional species of parasites were reared

in August, bringing the total number of species recorded to 46. Of these, 38 species are now definitely known to be parasitic on some stage of the oriental fruit moth, the remaining 8 species being doubtful rearings, although each was suspected of having been parasitic on the oriental fruit moth. He also reports 3 species of predators of this pest.

JAPANESE BEETLE AND ASIATIC BEETLE RESEARCH

Paradichlorobenzene fatal to Jap-beetle grubs in plunged pots.-- "In a series of mortality tests," J. W. Lipp, Moorestown, N. J., reports that "4-inch pots were infested with five Japanese beetle larvae each and plunged in untreated soil outdoors. Seven tests were run, each involving 64 pots (1 square yard). The first five treatments were at the rates of 1,000, 1,500, 2,000, 2,500, and 3,000 pounds per acre, the poison being mixed first with soil, 1/2 cubic foot being used to cover a square yard. The remaining two treatments were at the rates of 1,000 and 1,500 pounds per acre, the required quantity of poison being scattered directly on the surface of the pots and then covered with soil. * * * From the results obtained, it would seem that from the standpoint of larval mortality 1,500 pounds per acre is the minimum quantity which should be used and the chemical should be mixed with soil before applying. The soil seems to supply bulk and permit a more even distribution of the chemical over the area to be treated. It was apparent during the course of the treatments that it is easy to apply the paradichlorobenzene unevenly and so produce a condition where some pots do not receive enough to produce a complete kill."

Coated lead arsenate not a safe spray for grubs in grass.--M. R. Osburn reports that "On September 22, an experiment was conducted on a portion of the lawn at the Moorestown laboratory to determine the advisability of substituting oleate-coated lead arsenate for powdered lead arsenate in a spray to control Japanese beetle larvae. One plot of grass was sprayed with a suspension of powdered lead arsenate at the rate of 25 pounds of lead arsenate in 25 gallons of water to 1,000 square feet. A second plot of grass was sprayed with a suspension of oleate-coated lead arsenate at the rate of 58 pounds of coated lead arsenate (equal to 25 pounds powdered arsenate) in 25 gallons of water to 1,000 square feet. One half of each of these two plots was washed with water immediately after the application. The two remaining halves were left unwashed. On September 29, or one week later, the block sprayed with coated lead arsenate and left unwashed showed severe injury to the blades of grass. The block sprayed with the powdered lead arsenate and left unwashed was injured, but less severely than the coated lead arsenate plot. The injury to the two washed plots was slight, although noticeable. It is believed that the oleate-coated lead arsenate might be substituted for the powdered lead arsenate without severe injury to turf if care is taken to wash the grass thoroughly immediately after application."

TRUCK CROP AND GARDEN INSECTS

Mexican bean beetle migrates through mountain passes.--Reporting on the life history and habits of Epilachna corrupta Muls., J. R. Douglas, Estancia, N. Mex., says: "Beetles began their fall migration the latter part of August. The most intensive period was from September 8 to 17, inclusive, when 842 beetles were trapped in Tajique Canyon on a screen coated with a sticky tree-banding material, 430 beetles were trapped flying up the canyon, and 412 flying down the canyon. Observations in foothill canyons indicate that after the beetles enter the canyons there is considerable movement up and down the canyons before the beetles enter hibernation. On September 26 migration up foothill canyons was still under way. The last eggs were noted on September 21, and at the close of the month few larvae and pupae were noted in the fields. A few overwintered beetles are still living. * * * On September 26, J. G. Shaw observed a beetle on Bosque Mountain at an elevation of approximately 9,000 feet. As the crow flies this beetle was 6 miles from the nearest bean patch in the canyons and 10 miles from commercial plantings. The above observation indicates that the Mexican bean beetle is capable of crossing or migrating through mountain passes."

Entrance of Tarsonemus mites into tissue of Delphinium.--F. F. Smith, of the tropical greenhouse, Washington, D. C., has made "an interesting observation on the occurrence of all stages of Tarsonemus pallidus Bks. beneath the epidermal layer in the mesophyll tissue of Delphinium leaves. The mites enter through cracks in the epidermis which develop as the epidermis shrinks following the usual surface injury caused by their feeding. They were observed to have worked their way from the entrance for 1/16 to 5/8 inch along the loose mesophyll cells. The cells that they have fed upon become black, and this color is visible through the epidermal layer. This internal feeding of the mites may be the cause of the so-called 'blacks' observed on mite-injured larkspurs. In two tests immersion in hot water at 111° F. for 10 and 15 minutes, respectively, killed all stages."

Molasses increases toxicity of nicotine sulphate to hatching larvae of gladiolus thrips.--H. H. Richardson, of the tropical greenhouse, who has been studying the residual action of nicotine and nicotine sulphate combination sprays toward hatching larvae of Taeniothrips gladioli M. & S., reports that the following conclusions have been reached: "Where nicotine is in a volatile form such as free nicotine or nicotine sulphate soap, the residual action is apparently negligible, in fact much less than where nicotine sulphate alone is used. Nicotine sulphate alone is slightly effective. By combining nicotine sulphate with other substances (waste sulphite liquor, brown sugar, or molasses) it is apparently possible to retain it much longer on the foliage and its effectiveness against hatching thrips larvae is definitely increased. The data with molasses-nicotine sulphate are still meager, but even here this combination shows a decided increase in effectiveness. Apparently, this molasses combination is superior to either nicotine sulphate-waste sulphite liquor or nicotine sulphate-brown sugar. The better wetting and covering ability of molasses might explain this increased effectiveness."

Bordeaux spray stimulates growth of narcissus bulbs and repels lesser bulb fly.--Experiments by F. S. Blanton, Babylon, N. Y., to check the value of certain dilutions of a miscible oil with Bordeaux mixture--using a 2 per cent and a 4 per cent oil mixture and straight 4-4-50 Bordeaux--on three varieties of narcissus bulbs have shown that "(1) Oil in strong dilutions is injurious to the foliage and possibly to the bulbs; (2) when the oil has volatilized, it no longer serves as a repellent, if it ever did, and with the injured bulb the percentage of flies becomes higher; (3) straight 4-4-50 Bordeaux not only keeps the plants in a healthy growing condition that reduces the chance of the fly entering the bulb, but also, to a certain extent, stimulates and invigorates growth."

Lethal dosage of hydrocyanic acid gas for bulb insects.--C. F. Doucette, Sumner, Wash., reports that "An exposure of one hour, using a dosage of sodium cyanide that would provide an average concentration of 3 mg. of hydrocyanic acid gas per liter of air, gave complete mortality of larvae of the narcissus bulb fly (Merodon equestris Fab.) which were definitely and directly exposed to the gas by opening the bulbs just previous to fumigation so that the larvae were in the open. An exposure of two hours at the same concentration and the same conditions also gave complete mortality." This method is differentiated from the fumigation of infested bulbs where the flies are in their natural environment. Mr. Doucette has also tested this method against species of Eumerus. He found that either a one-hour or a two-hour exposure of the larvae to an average concentration of 3 mg. of hydrocyanic acid gas per liter of air resulted in a 100 per cent kill. Ralph Schupp, Sumner, conducted similar experiments against Liothrips vaneeckei Priessner and reports that "in both cases (after one-hour and two-hour exposures) all stages were killed. No eggs hatched in the treated bulbs."

FOREST INSECTS

Control of bark beetles by tree-injection method.--In connection with control of the bark beetles by the use of chemicals, R. A. St. George, Asheville, N. C., reports that preliminary results indicate that as small a dosage as one-half gram of sodium arsenite injected into small (6 inches diameter-breast-high and 35 feet tall) shortleaf pine trees by the saw-kerf method will kill the brood of the southern pine beetle (Dendroctonus frontalis Zimm.) in recently attacked trees. For successful results it is necessary to inject the chemical soon after attack.

Penetrative oils control early brood of western pine beetle.--J. M. Miller, Berkeley, Calif., reports a series of experiments testing "the use of penetrative oils to control the western pine beetle (Dendroctonus brevicomis Lec.) without peeling or burning the bark (of the ponderosa pines) * * * Results were found to be highly effective if the oil was applied during the early brood stages. Applications during the pupal and new-adult stages were less effective, indicating that the oils act slowly in reaching the brood and producing mortality."

New species of Tetrastichus attacks elm leaf beetle.--P. A. Berry, of the gipsy moth laboratory, Melrose Highlands, Mass., has been making observations on the biology of a species of Tetrastichus that was found parasitizing larvae and pupae of the elm leaf beetle (Galerucella xanthomelaena Schr.). Specimens of the parasite have been determined by C. F. W. Muesebeck, Washington, D. C., as a new species of Tetrastichus. Mr. Berry submits the following notes on parasitization by this Tetrastichus: "From 400 pupae collected at Woburn, Mass., on August 17, parasites emerged from 92. Dissections showed that 96 more pupae contained living, full-grown parasite larvae, making a total of 188 of the 400 pupae, or 47 per cent parasitized. Apparently the parasite will spend the winter as a full-grown larva. From 54 pupae and 75 larvae collected at North Woodbury, Conn., on August 23, a total of 80 pupae were obtained. Parasites issued from 18 and 16 others had living parasite larvae in them, giving a parasitism of 42.5 per cent. Five, or 10 per cent, of 50 pupae sent from Washington, D. C., were parasitized."

Receipt of parasites of birch leaf-mining sawfly.--P. B. Dowden, Melrose Highlands, reports that the following parasite material of Phyllostoma nemorata Fall. was received from W. F. Sellers, Budapest, Hungary: "From Freistadt, Austria: 6,092 Phyllostoma mines containing chalcid larvae; 2,539 Phyllostoma hibernacula; 153 Phanomeris phyllostomae cocoons; from Monichkirche, Austria: 121 Phyllostoma mines containing chalcid larvae. The great majority of the chalcid larvae will evidently overwinter in that stage or as pupae. A total of 328 adults representing seven species have, nevertheless, already issued. The most conspicuous of these is Chrysocharis sp., of which there have been 128 specimens."

CEREAL AND FORAGE INSECTS

Beggarweed a preferred food plant of corn ear worm in Georgia.--Reporting on hosts of the corn ear worm, Geo. W. Barber, Savannah, Ga., says: "During the second and third weeks of September very large numbers of Heliothis obsoleta Fab. associated with Heliothis virescens Fab. passed through a fifth generation on beggarweed (Meibomia sp.). While H. obsoleta was scarce during 1930 and 1931 on this food plant, it was present in numbers in some cornfields, easily surpassing the possible population of the corn plants of such fields. In such fields the beggarweed grows shoulder high and so thick as to completely cover acres of early planted corn, the stalks of corn still standing (September 27). This allows the insect to build up an overwintering population much greater than would be the case if the corn were harvested earlier and the beggarweed cut for hay before seeding. Observations in 1932 have indicated that this suggestion might well be added to our recommendations for control of this insect in the South. It was particularly noted this year that the ear worms feeding on beggarweed were of large size--fully as large as most individuals feeding on corn ears, much larger than the H. virescens larvae feeding with them."

Increased injury from cutworms in 1933 indicated for western Oregon.--L. P. Rockwood, Forest Grove, Oreg., reports that "Bait traps that have been used for the past 6 years captured more noctuid moths in August and September than in any year since 1929. The record number of 809 Euxoa messoria Harr., the common dark-sided cutworm, has been taken to date, the maximum flight occurring on the nights of September 9 and 10. * * * Judging from past records, considerable injury by E. messoria and E. septentrionalis Wlk. to garden and field crops in April, May, and early June, 1933, may be anticipated. These species winter as first-stage larvae in the eggs and are not much affected by even extreme winter weather conditions. Injury from the species wintering as partly grown larvae, namely Neuria procincta Grote, Graphiphora c-nigrum L., and Rhynchagrotis insularis Grote, may be expected if the winter is mild. The same is probably true of Agrotis ypsilon Rott., which, in some cases, probably winters as adults or as larvae or pupae."

The differential grasshopper enters Montana.--"On September 28," reports J. R. Parker, "J. H. Pepper, collaborator at Bozeman, Mont., found Melanoplus differentialis Thos. in considerable numbers near Glendive, Mont. This is the first record of the occurrence of this important species in Montana. The nearest place where it was known previously is Hettinger County, N. Dak., some 125 miles to the southeast. It seems highly probable that the colony at Glendive migrated from North or South Dakota during the periods of extensive flights by this species in July and August of the past two summers. It will be highly interesting to determine how long the colony will be able to maintain itself in an area outside of its natural range."

Grasshopper fungus fails to control pest in South Dakota.--Mr. Parker states that "F. A. Morton, who is surveying southeastern South Dakota and part of Nebraska, reports a striking difference in the extent of damage done and the number of eggs found on each side of the Missouri River where it forms the boundary between the two States. On the South Dakota side farmers depended to a large extent on artificial cultures of the grasshopper fungus to kill grasshoppers. The results were negative and in September serious crop damage was in evidence and eggs were plentiful. In the Nebraska side poisoned bran mash was used successfully in preventing crop losses and eggs were difficult to find. Thus far, Mr. Norton has not found eggs in Nebraska in sufficient numbers to indicate serious trouble next year."

Differential grasshopper concentrates eggs in headlands.--Mr. Parker says that "The egg survey showed that most of the oviposition of Melanoplus differentialis took place in headlands adjacent to cornfields. If the headland was of buffalo sod, most of the differentialis eggs were laid in bunches of this grass. When the headland consisted of blue-joint and other taller grasses, the eggs were found along the very edge of the sod of ditch banks. Of the egg predators only 3 or 4 carabid larvae were found in the whole survey. This is rather singular in that in North Dakota carabid larvae occur in great numbers in many places,

running as high as 7 to 8 per square foot in egg beds. Bee-fly and blister-beetle larvae were quite common, although not so abundant as in North Dakota. Given a relatively dry weather condition next June, these heavily infested headlands of cornfield will prove a menace to the adjoining crop and also to other fields in the immediate vicinity. The outbreak in 1933 will be much more localized, being confined largely to these places, and generally speaking the grasshopper situation has been greatly mitigated."

Sarcophagid flies aid control of grasshoppers in Sully County, S. Dak.--On the biological control of grasshoppers, Mr. Parker says: "Parasitism by sarcophagid flies was quite prevalent, but of greater consequence in Sully County * * * As high as 10 to 15 dead hoppers per square foot were found along the edges of cornfields, and in some fields from 5 to 10 dead per linear foot of corn row were found. This greatly reduced oviposition potential. When you consider causes other than weather, the greater part of the decimation of the grasshopper population, this year, in this part of the country was accomplished by the sarcophagid flies."

COTTON INSECTS

Sodium fluosilicate dust shows promise for control of cotton flea hopper.--"A total of 109 cage toxicity tests were completed," by K. P. Ewing and assistants, Tallulah, La., "with adults of Psallus seriatus Reut. on croton and 72 with P. seriatus nymphs on croton * * * Sodium fluosilicate stands at the top in percentage of mortality of both adults and nymphs. Of the adults the mortality at the end of the fourth day was 90 per cent, and of the nymphs 77.3 per cent. Of the insecticides thus far experimented with that could be considered of practical value for field control, sodium fluosilicate is the only one that gives a high kill of both adults and nymphs."

Rotenone found lethal to tarnished plant bug.--G. L. Smith and assistants, Tallulah, report that "Derris root (rotenone) gave rather startling results (as an insecticide) in view of the previous experiments conducted with this material on other insects (than the boll weevil) here. The first series of four cage tests conducted with this material on adults was in conjunction with four cages conducted with each of the four copper arsenites, potassium hexafluoroaluminate, and sodium fluosilicate. It was found that 73.2 per cent of the insects in the cages dusted with derris root were killed at the time of the first reading, 5 hours after the dusting, while only 0.7 per cent were dead in the check cages. To eliminate the possibility of the host plant (Erigeron canadensis), being a factor in producing the kill, two additional series of tests were conducted, using goldenrod and cotton as the host plants. In all the tests a comparatively high mortality resulted. The total mortality at the end of 4 days in the 13 cages on E. canadensis was 86.4 per cent; in the 9 cages on goldenrod it was 83.9 per cent; and in the 5 cages on cotton, 68.7 per cent."

Boll weevil develops on Althea buds under cage conditions.--R. C. Gaines, Tallulah, reporting on the development of boll weevils on malvaceous plants other than cotton, says: "Three female boll weevils developed in and emerged from Althea buds during the month--1 on September 12, 1 on September 17, and 1 on September 19. On August 15, 10 pairs of newly emerged weevils were released in a cage over an Althea plant. These weevils had emerged from cotton squares collected for parasite studies and were not permitted to feed on cotton before being released in the Althea cage. On August 29 practically all buds and blooms had fallen to the floor of the cage. These fallen forms, about 40 in number, were collected on August 29 and placed in a small screen wire cage in the insectary for observation. On September 12 the first female weevil emerged from one of these Althea buds. The second female emerged on September 17, and the third female on September 19."

Seasonal development of pink bollworm in Big Bend of Texas.--S. L. Calhoun and assistants, Presidio, Tex., report observations of Pectinophora gossypiella Saund. as follows: "Four complete generations and a partial fifth generation of the pink bollworm had completed development on cotton squares at Presidio, Tex., up to September 30, while two and a partial third generations had completed development in bolls at that date. The average longevity for third square brood females was 8.50 days and 13.90 days for those of the second boll brood at mean temperatures of 81.97° F. and 77.58° F., respectively. For males of the third square brood, the average longevity was 7.33 days at a mean temperature of 83.88° F. Longevity records on males for the second boll brood were not complete on September 30."

Survival of pink bollworm in Texas flood.--Mr. Calhoun and assistants also observed that "Approximately 50 per cent of the larvae in green bolls on the cotton plants which were submerged by flood waters from 36 to 60 hours were killed. Live larvae in floating open bolls were recovered after the bolls had been in water 192 hours. No live stages were found after this period of time. In open bolls that had been submerged a few live larvae were found after 96 hours but none after this period of time. Live stages were recorded in floating green bolls 240 hours, or 10 days, after being placed in the water. In bolls allowed to remain 14 days in water no live larvae were found. Half of the bolls in water at the end of 14 days were floating."

INSECTS AFFECTING MAN AND ANIMALS

Observations on the "whip scorpion" or "vinegarroon."--O. G. Babcock, Sonora, Tex., reports that "A live vinegarroon was kept in captivity for 262 days. During this time it was fed many soft-bodied insects. The hard-shelled sowbugs and beetles were refused. The vinegarroon was less active during the winter, feeding only at approximately monthly periods until it died on June 30, 1932. The method of protection was by means of a gaseous secretion of acetic acid (vinegar) from the tail, hence its appropriate local name 'vinegarroon.' I would suggest dropping the name 'whip scorpion,' as this arthropod is not a scorpion."

Sodium fluoride dip for chickens effective for a month.--Reporting on investigations of the chicken head louse (Lipeurus heterographus Nitz.), Harold S. Peters, Takoma Park, Md., says: "On August 30 several chickens were dipped in a solution of sodium fluoride as recommended for louse eradication. Ten days later, in an effort to remove any sodium fluoride remaining in the feathers, one of these chickens was dipped in plain water. Two, three, and four weeks after the original sodium fluoride dipping, lice were placed on the chickens and promptly died, showing that this dust was effective for at least a month, even on the chicken that was dipped in water."

Parasite of brown dog tick active in Texas.--H. O. Schroeder, Brownsville, Tex., reports that "One of the heaviest infestations of the brown dog tick (Rhipicephalus sanguineus Latr.) ever to come under my observation has been almost completely wiped out, owing mainly to the activity of the tick parasite Hunterellus hookeri How., which occurs locally in southern Texas. * * * a dog and the premises to which it is confined had been heavily infested for almost two years before the parasite made its appearance. After less than 6 months' activity the parasite has reduced the infestation to a point where it no longer constitutes a problem. Since the flight range of the parasite is not very great, it must depend largely on being carried to new infestations by the dog on which its nymphal host is feeding. For this reason ticks may flourish within a few blocks of the place where the parasite is active. This is also borne out by the fact that the parasite was collected about four blocks from the infestation in question more than a year before the infestation made its appearance there."

Gambusia patruelis (Baird and Girard) well established near Portland, Oreg.--"A rather complete survey has been made," by H. H. Stage and assistants, "of the waters in which Gambusia patruelis has been placed during the past two years. It was especially interesting to learn that the flooding of the Columbia River across the island on which the insects were originally placed only scattered them to every pond and slough on the island. Ponds located at a distance of a mile upstream and 3 miles downstream on Hayden Island are now well stocked with this mosquito-destroying top minnow and it seems to be reproducing very satisfactorily, notwithstanding the numbers of predacious fish associated. The State fish and game warden has reported that he has taken these minnows while seining on Sauvies Island, a distance of some 6 miles from where they were originally planted. In order to give these minnows a maximum amount of protection, we have seined as many of the predacious fishes as possible from the pond on Hayden Island where G. patruelis was first introduced. Thousands of small bass and perch were removed. Stomachs of several of these were examined and practically all contained one or two specimens of Gambusia."

Work of botflies in tongues of horses.--R. W. Wells and E. F. Knipling, Galesburg, Ill., who are engaged in studies of Gastrophilus spp., report that "On September 23 at Rockford, Ill., we made examination of many horses being slaughtered there. Nearly all of the tongues showed

evidences of boring larvae of the horse botfly (G. intestinalis De G.). A more detailed examination was made on 4 well-infested tongues. Not all of the larvae were removed from the tongues but it is established that there were 50 to 100 larvae in each tongue. Of 40 extracted, all G. intestinalis, 38 were headed posteriorly. As stated by Dinulescu, the larvae maintain lateral openings to the surface of tongue as they proceed posteriorly, presumably for obtaining air, for the larvae had the spiracles outermost near the surface. Larvae of only G. intestinalis were found in the tongue, although in the ducdenum were found all sizes of second-stage and third-stage throat botfly (G. nasalis L.), usually in such abundance that the organ was considerably congested with them. We have not found G. nasalis in the tongues, nor attached anywhere in the buccal region, although in the same hosts they were abundant inthe ducdenum, not at all in the stomach. We are somewhat doubtful that G. nasalis burrows in the tongue, though their absence may have been seasonal. Many tongues were almost raw with the many intermingled channels of G. intestinalis and the subsequent sloughing of tissue. We have a very heavily infested tongue preserved in a museum jar for exhibit. It is a very striking exhibition of the early work of these tiny larvae."

STORED PRODUCT INSECTS

Fig moth found in fallen fruit in orchards.--In September H. C. Donohoe, Fresno, Calif., continued his observations on the unharvested first-crop Mission figs. Perez Simmons reports that "On September 27 Mr. Donchoe estimated by sampling that the average number of figs was 95 per tree (2/3 buried, 1/3 on surface), or 4,750 per acre. A sample collected on September 20 and examined in detail on September 30 yielded an average of about 2 larvae per fig. About one-half of these larvae were small and, since many small larvae which burrow in the flesh of the fruit are overlooked at the first examination, the actual rate of infestation of the sample was probably somewhat higher. One sample, collected August 16, still contained small larvae when examined for the third time 25 days after the collection date."

Trap catches of tobacco pests.--In September W. D. Reed and assistants, Richmond, Va., continued their "cooperative trapping experiments with a cigarette company in Richmond. A summary of the biweekly records of these traps, located in a Turkish tobacco warehouse, since August 12" gives a total of 5,336,399 adults of the cigarette beetle (Lasiocerma serricorne Fab.) and 13,695 adults of the tobacco moth (Ephestia elutella Hbn.). In another trapping experiment undertaken in cooperation with a tobacco company in North Carolina, 2,562,704 cigarette beetles and 1,618 tobacco moths were caught in seven suction light traps during the period September 19 to 26.

Life history of the tobacco moth.--Mr. Reed reports observations on E. elutella by E. M. Livingstone as follows: "The first pupation of the second brood of moths occurred September 20. Most of the second-generation larvae were one-half to two-thirds grown. * * * all eggs were laid between 4 p.m. and 10 p.m. The peak of the egg laying occurred between 6 p.m. and 7 p.m."

One pound of HCN per car fails to kill rice and granary weevils.--According to George B. Wagner, Kansas City, Mo., "The mills and railroad companies of the Southwest have been bothered with insects back of the grain lining in box cars infesting flour in transit. Fumigation of the box cars was started September 13. Approximately 100 cars have been fumigated before being loaded with flour, using 1 pound of liquid hydrocyanic acid per car. Results of the fumigation to date indicate that this dosage is not enough, since on the average we can only obtain a kill of 48.75 per cent of granary and rice weevils and 86.75 per cent of the other insects. Other insects included Oryzaephilus surinamensis L., Cryptolestes pusillus Schoen., Tenebroides mauritanicus L., Cryptolestes ferrugineus Steph., Tribolium confusum Duv., Tribolium ferrugineum Fab., and Rhizopertha dominica Fab."

Volunteer peas prove to be a source of pea-weevil infestation.--Tom Brindley, Moscow, Idaho, has studied the effect of volunteer peas (those that come up from seeds lost during harvesting) on the weevil populations. His data show that "the weevils readily find these peas at about the time they bloom. They are very heavily infested. In any control program much attention must be given to the elimination of these peas. Observations show that fields that are disked early in the fall, or fields on which sheep have been permitted to pasture, have very few volunteers the following season. This, of course, is from only one season's observations."